



SEQUENCE LISTING

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DEC 4 2008

TECH CENTER 1600/2900

<110> Chambers, Thomas J.
Guirakhoo, Farshad
Monath, Thomas P.

<120> CHIMERIC FLAVIVIRUS VACCINES

<130> 06132/033003

<140> 09/121,587

<141> 1998-07-23

<150> US98/03894

<151> 1998-03-02

<150> 09/007,664

<151> 1998-01-15

<150> 08/807,445

<151> 1997-02-28

<160> 29

<170> FastSEQ for Windows Version 4.0

<210> 1

<211> 1983

<212> DNA

<213> Dengue-2 virus

<220>

<221> CDS

<222> (1)...(1983)

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Phe His Leu Thr Thr Arg Asn Gly Glu Pro His Met Ile Val Ser Arg
1 5 10 15

caa gag aaa ggg aaa agt ctt ttg ttt aaa aca gag gat ggc gtg aac 96
Gln Glu Lys Gly Lys Ser Leu Leu Phe Lys Thr Glu Asp Gly Val Asn
20 25 30

atg tgc acc ctc atg gcc atg gac ctt ggt gaa ttg tgt gaa gac aca 144
Met Cys Thr Leu Met Ala Met Asp Leu Gly Glu Leu Cys Glu Asp Thr
35 40 45

atc acg tac aag tgt ccc ctt ctc agg cag aat gag cca gaa gac ata 192

Ile	Thr	Tyr	Lys	Cys	Pro	Leu	Leu	Arg	Gln	Asn	Glu	Pro	Glu	Asp	Ile		
50						55					60						
gac	tgc	tg	g	tgc	aac	tcc	acg	tcc	acg	tg	g	acc	tat	ggg	act	tgt	240
Asp	Cys	Trp	Cys	Asn	Ser	Thr	Ser	Thr	Trp	Val	Thr	Tyr	Gly	Thr	Cys		
65					70				75						80		
acc	acc	acg	gga	gaa	cat	aga	aga	gaa	aaa	aga	tca	gtg	gca	ctc	ggt		288
Thr	Thr	Thr	Gly	Glu	His	Arg	Arg	Glu	Lys	Arg	Ser	Val	Ala	Leu	Val		
				85					90					95			
cca	cat	gtg	gga	atg	gga	ctg	gag	acg	cga	act	gaa	aca	tg	g	atg	tca	336
Pro	His	Val	Gly	Met	Gly	Leu	Glu	Thr	Arg	Thr	Glu	Thr	Trp	Met	Ser		
			100					105					110				
tca	gaa	ggg	gct	tg	g	aaa	cat	gcc	cag	aga	att	gaa	att	tg	g	atc	ctg
Ser	Glu	Gly	Ala	Trp	Lys	His	Ala	Gln	Arg	Ile	Glu	Ile	Trp	Ile	Leu		384
		115					120						125				
aga	cat	cca	ggc	ttc	acc	ata	atg	gca	gca	atc	ctg	gca	tac	acc	ata		432
Arg	His	Pro	Gly	Phe	Thr	Ile	Met	Ala	Ala	Ile	Leu	Ala	Tyr	Thr	Ile		
	130					135					140						
ggg	acg	aca	cat	ttc	cag	aga	gca	ctg	att	ttc	atc	tta	ctg	aca	gct		480
Gly	Thr	Thr	His	Phe	Gln	Arg	Ala	Leu	Ile	Phe	Ile	Leu	Leu	Thr	Ala		
145				150					155					160			
gtc	gct	cct	tca	atg	aca	atg	cgt	tgc	ata	gga	ata	tca	aat	aga	gac		528
Val	Ala	Pro	Ser	Met	Thr	Met	Arg	Cys	Ile	Gly	Ile	Ser	Asn	Arg	Asp		
				165				170					175				
ttt	gta	gaa	ggg	gtt	tca	gga	gga	agc	tg	g	gac	ata	gtc	tta	gaa		576
Phe	Val	Glu	Gly	Val	Ser	Gly	Gly	Ser	Trp	Val	Asp	Ile	Val	Leu	Glu		
			180					185					190				
cat	gga	agc	tgt	gtg	acg	acg	atg	gca	aaa	aac	aaa	cca	aca	ttg	gat		624
His	Gly	Ser	Cys	Val	Thr	Thr	Met	Ala	Lys	Asn	Lys	Pro	Thr	Leu	Asp		
		195					200					205					
ttt	gaa	ctg	ata	aaa	aca	gaa	gcc	aaa	cag	cct	gcc	acc	cta	agg	aag		672
Phe	Glu	Leu	Ile	Lys	Thr	Glu	Ala	Lys	Gln	Pro	Ala	Thr	Leu	Arg	Lys		
		210				215					220						
tac	tgt	ata	gag	gca	aag	cta	acc	aac	aca	aca	aca	gaa	tct	cgt	tgc		720
Tyr	Cys	Ile	Glu	Ala	Lys	Leu	Thr	Asn	Thr	Thr	Thr	Glu	Ser	Arg	Cys		
225					230				235					240			
cca	aca	caa	ggg	gaa	ccc	agc	cta	aat	gaa	gag	cag	gat	aaa	agg	ttc		768
Pro	Thr	Gln	Gly	Glu	Pro	Ser	Leu	Asn	Glu	Glu	Gln	Asp	Lys	Arg	Phe		
				245					250					255			

gtc tgc aaa cac tcc atg gta gac aga gga tgg gga aat gga tgt gga	816
Val Cys Lys His Ser Met Val Asp Arg Gly Trp Gly Asn Gly Cys Gly	
260 265 270	
tta ttt gga aag gga ggc att gtg acc tgt gct atg ttc aca tgc aaa	864
Leu Phe Gly Lys Gly Gly Ile Val Thr Cys Ala Met Phe Thr Cys Lys	
275 280 285	
aag aac atg gag gga aaa gtt gtg cag cca gaa aac ttg gaa tac acc	912
Lys Asn Met Glu Gly Lys Val Val Gln Pro Glu Asn Leu Glu Tyr Thr	
290 295 300	
att gtg gta aca ccc cac tca ggg gaa gag cat gcg gtc gga aat gac	960
Ile Val Val Thr Pro His Ser Gly Glu Glu His Ala Val Gly Asn Asp	
305 310 315 320	
aca gga aaa cat ggc aag gaa atc aaa gta aca cca cag agt tcc atc	1008
Thr Gly Lys His Gly Lys Glu Ile Lys Val Thr Pro Gln Ser Ser Ile	
325 330 335	
aca gaa gca gaa ttg aca ggt tat ggc act gtc acg atg gag tgc tct	1056
Thr Glu Ala Glu Leu Thr Gly Tyr Gly Thr Val Thr Met Glu Cys Ser	
340 345 350	
ccg aga aca ggc ctc gac ttc aat gag atg gtg ttg ctg cag atg gaa	1104
Pro Arg Thr Gly Leu Asp Phe Asn Glu Met Val Leu Leu Gln Met Glu	
355 360 365	
aat aaa gct tgg ctg gtg cat agg caa tgg ttc cta gac ctg ccg tta	1152
Asn Lys Ala Trp Leu Val His Arg Gln Trp Phe Leu Asp Leu Pro Leu	
370 375 380	
cca tgg ctg ccc gga gcg gac aca caa ggg tca aat tgg ata caa aaa	1200
Pro Trp Leu Pro Gly Ala Asp Thr Gln Gly Ser Asn Trp Ile Gln Lys	
385 390 395 400	
gaa aca ttg gtc act ttc aaa aat cct cat gcg aag aaa cag gat gtt	1248
Glu Thr Leu Val Thr Phe Lys Asn Pro His Ala Lys Lys Gln Asp Val	
405 410 415	
gtt gtt tta gga tcc caa gaa ggg gcc atg cac aca gca ctc aca ggg	1296
Val Val Leu Gly Ser Gln Glu Gly Ala Met His Thr Ala Leu Thr Gly	
420 425 430	
gcc aca gaa atc caa atg tca tca gga aac tta ctc ttc aca gga cat	1344
Ala Thr Glu Ile Gln Met Ser Ser Gly Asn Leu Leu Phe Thr Gly His	
435 440 445	
ctc aag tgc agg ctg aga atg gac aag cta cag ctc aaa gga atg tca	1392
Leu Lys Cys Arg Leu Arg Met Asp Lys Leu Gln Leu Lys Gly Met Ser	
450 455 460	

[illegible]

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 <211> 661
 <212> PRT
 <213> Dengue-2 virus

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 20 25 30
 Met Cys Thr Leu Met Ala Met Asp Leu Gly Glu Leu Cys Glu Asp Thr
 35 40 45
 Ile Thr Tyr Lys Cys Pro Leu Arg Gln Asn Glu Pro Glu Asp Ile
 50 55 60
 Asp Cys Trp Cys Asn Ser Thr Ser Thr Trp Val Thr Tyr Gly Thr Cys
 65 70 75 80
 Thr Thr Thr Gly Glu His Arg Arg Glu Lys Arg Ser Val Ala Leu Val
 85 90 95
 Pro His Val Gly Met Gly Leu Glu Thr Arg Thr Glu Thr Trp Met Ser
 100 105 110
 Ser Glu Gly Ala Trp Lys His Ala Gln Arg Ile Glu Ile Trp Ile Leu
 115 120 125
 Arg His Pro Gly Phe Thr Ile Met Ala Ala Ile Leu Ala Tyr Thr Ile
 130 135 140
 Gly Thr Thr His Phe Gln Arg Ala Leu Ile Phe Ile Leu Leu Thr Ala
 145 150 155 160
 Val Ala Pro Ser Met Thr Met Arg Cys Ile Gly Ile Ser Asn Arg Asp
 165 170 175
 Phe Val Glu Gly Val Ser Gly Gly Ser Trp Val Asp Ile Val Leu Glu
 180 185 190
 His Gly Ser Cys Val Thr Thr Met Ala Lys Asn Lys Pro Thr Leu Asp
 195 200 205
 Phe Glu Leu Ile Lys Thr Glu Ala Lys Gln Pro Ala Thr Leu Arg Lys
 210 215 220
 Tyr Cys Ile Glu Ala Lys Leu Thr Asn Thr Thr Thr Glu Ser Arg Cys
 225 230 235 240
 Pro Thr Gln Gly Glu Pro Ser Leu Asn Glu Glu Gln Asp Lys Arg Phe
 245 250 255
 Val Cys Lys His Ser Met Val Asp Arg Gly Trp Gly Asn Gly Cys Gly
 260 265 270
 Leu Phe Gly Lys Gly Gly Ile Val Thr Cys Ala Met Phe Thr Cys Lys
 275 280 285
 Lys Asn Met Glu Gly Lys Val Val Gln Pro Glu Asn Leu Glu Tyr Thr
 290 295 300
 Ile Val Val Thr Pro His Ser Gly Glu Glu His Ala Val Gly Asn Asp
 305 310 315 320
 Thr Gly Lys His Gly Lys Glu Ile Lys Val Thr Pro Gln Ser Ser Ile
 325 330 335

Thr Glu Ala Glu Leu Thr Gly Tyr Gly Thr Val Thr Met Glu Cys Ser
 340 345 350
 Pro Arg Thr Gly Leu Asp Phe Asn Glu Met Val Leu Leu Gln Met Glu
 355 360 365
 Asn Lys Ala Trp Leu Val His Arg Gln Trp Phe Leu Asp Leu Pro Leu
 370 375 380
 Pro Trp Leu Pro Gly Ala Asp Thr Gln Gly Ser Asn Trp Ile Gln Lys
 385 390 395 400
 Glu Thr Leu Val Thr Phe Lys Asn Pro His Ala Lys Lys Gln Asp Val
 405 410 415
 Val Val Leu Gly Ser Gln Glu Gly Ala Met His Thr Ala Leu Thr Gly
 420 425 430
 Ala Thr Glu Ile Gln Met Ser Ser Gly Asn Leu Leu Phe Thr Gly His
 435 440 445
 Leu Lys Cys Arg Leu Arg Met Asp Lys Leu Gln Leu Lys Gly Met Ser
 450 455 460
 Tyr Ser Met Cys Thr Gly Lys Phe Lys Val Val Lys Glu Ile Ala Glu
 465 470 475 480
 Thr Gln His Gly Thr Ile Val Ile Arg Val Gln Tyr Glu Gly Asp Gly
 485 490 495
 Ser Pro Cys Lys Ile Pro Phe Glu Ile Met Asp Leu Glu Lys Arg His
 500 505 510
 Val Leu Gly Arg Leu Ile Thr Val Asn Pro Ile Val Thr Glu Lys Asp
 515 520 525
 Ser Pro Val Asn Ile Glu Ala Glu Pro Pro Phe Gly Asp Ser Tyr Ile
 530 535 540
 Ile Ile Gly Val Glu Pro Gly Gln Leu Lys Leu Asn Trp Phe Lys Lys
 545 550 555 560
 Gly Ser Ser Ile Gly Gln Met Phe Glu Thr Thr Met Arg Gly Ala Lys
 565 570 575
 Arg Met Ala Ile Leu Gly Asp Thr Ala Trp Asp Phe Gly Ser Leu Gly
 580 585 590
 Gly Val Phe Thr Ser Ile Gly Lys Ala Leu His Gln Val Phe Gly Ala
 595 600 605
 Ile Tyr Gly Ala Ala Phe Ser Gly Val Ser Trp Thr Met Lys Ile Leu
 610 615 620
 Ile Gly Val Ile Ile Thr Trp Ile Gly Met Asn Ser Arg Ser Thr Ser
 625 630 635 640
 Leu Ser Val Ser Leu Val Leu Val Gly Val Val Thr Leu Tyr Leu Gly
 645 650 655
 Val Met Val Gly Ala
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<210> 3
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 <212> PRT
 <213> Japanese Encephalitis virus

<400> 3
 Tyr Ala Gly Ala Met Lys Leu

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5

<210> 4

<211> 7

<212> PRT

<213> Yellow Fever virus

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<210> 5

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<212> PRT

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<223> derived from Japanese Encephalitis virus and
Yellow Fever virus

<400> 5

Met Thr Gly Gly Met Lys Leu

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<210> 6

<211> 7

<212> PRT

<213> Japanese Encephalitis virus

<400> 6

Asn Lys Arg Gly Gly Asn Glu

1

5

<210> 7

<211> 7

<212> PRT

<213> Yellow Fever virus

<400> 7

Lys Arg Arg Ser His Asp Val

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<210> 8

<211> 7

<212> PRT

<213> Artificial Sequence

<220>
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Encephalitis Virus

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<210> 9
<211> 10
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<400> 9
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1 5 10

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<212> PRT
<213> Yellow Fever virus

<400> 10
Leu Gly Val Gly Ala Asp Gln Gly Cys Ala
1 5 10

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Yellow Fever virus

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<210> 12
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Yellow Fever virus

<221> CDS

<222> (119)...(10381)

<400> 12

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atg tct ggt cgt aaa gct cag gga aaa acc ctg ggc gtc aat atg gta 166
Met Ser Gly Arg Lys Ala Gln Gly Lys Thr Leu Gly Val Asn Met Val
1 5 10 15

cga cga gga gtt cgc tcc ttg tca aac aaa ata aaa caa aaa aca aaa 214
Arg Arg Gly Val Arg Ser Leu Ser Asn Lys Ile Lys Gln Lys Thr Lys
20 25 30

caa att gga aac aga cct gga cct tca aga ggt gtt caa gga ttt atc 262
Gln Ile Gly Asn Arg Pro Gly Pro Ser Arg Gly Val Gln Gly Phe Ile
35 40 45

ttt ttc ttt ttg ttc aac att ttg act gga aaa aag atc aca gcc cac 310
Phe Phe Phe Leu Phe Asn Ile Leu Thr Gly Lys Lys Ile Thr Ala His
50 55 60

cta aag agg ttg tgg aaa atg ctg gac cca aga caa ggc ttg gct gtt 358
Leu Lys Arg Leu Trp Lys Met Leu Asp Pro Arg Gln Gly Leu Ala Val
65 70 75 80

cta agg aaa gtc aag aga gtg gtg gcc agt ttg atg aga gga ttg tcc 406
Leu Arg Lys Val Lys Arg Val Val Ala Ser Leu Met Arg Gly Leu Ser
85 90 95

tca agg aaa cgc cgt tcc cat gat gtt ctg act gtg caa ttc cta att 454
Ser Arg Lys Arg Arg Ser His Asp Val Leu Thr Val Gln Phe Leu Ile
100 105 110

ttg gga atg ctg ttg atg acg ggt gga atg aag ttg tcg aat ttc cag 502
Leu Gly Met Leu Leu Met Thr Gly Gly Met Lys Leu Ser Asn Phe Gln
115 120 125

ggg aag ctt ttg atg acc atc aac aac acg gac att gca gac gtt atc 550
Gly Lys Leu Leu Met Thr Ile Asn Asn Thr Asp Ile Ala Asp Val Ile
130 135 140

gtg att ccc acc tca aaa gga gag aac aga tgt tgg gtt cgg gca atc 598
Val Ile Pro Thr Ser Lys Gly Glu Asn Arg Cys Trp Val Arg Ala Ile
145 150 155 160

gac gtc ggc tac atg tgt gag gac act atc acg tac gaa tgt cct aag 646
Asp Val Gly Tyr Met Cys Glu Asp Thr Ile Thr Tyr Glu Cys Pro Lys
165 170 175

ctt acc atg ggc aat gat cca gag gat gtg gat tgc tgg tgt gac aac 694
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Gln	Glu	Val	Tyr	Val	Gln	Tyr	Gly	Arg	Cys	Thr	Arg	Thr	Arg	His	Ser		
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aag	cga	agc	agg	aga	tcc	gtg	tcg	gtc	caa	aca	cat	ggg	gag	agt	tca	790	
Lys	Arg	Ser	Arg	Arg	Ser	Val	Ser	Val	Gln	Thr	His	Gly	Glu	Ser	Ser		
	210					215					220						
cta	gtg	aat	aaa	aaa	gag	gct	tgg	ctg	gat	tca	acg	aaa	gcc	aca	cga	838	
Leu	Val	Asn	Lys	Lys	Glu	Ala	Trp	Leu	Asp	Ser	Thr	Lys	Ala	Thr	Arg		
225					230					235					240		
tat	ctc	atg	aaa	act	gag	aac	tgg	atc	ata	agg	aat	cct	ggc	tat	gct	886	
Tyr	Leu	Met	Lys	Thr	Glu	Asn	Trp	Ile	Ile	Arg	Asn	Pro	Gly	Tyr	Ala		
			245					250						255			
ttc	ctg	gcg	gcg	gta	ctt	ggc	tgg	atg	ctt	ggc	agt	aac	aac	ggg	caa	934	
Phe	Leu	Ala	Ala	Val	Leu	Gly	Trp	Met	Leu	Gly	Ser	Asn	Asn	Gly	Gln		
		260					265					270					
cgc	gtg	gta	ttt	acc	atc	ctc	ctg	ctg	ttg	gtc	gct	ccg	gct	tac	agt	982	
Arg	Val	Val	Phe	Thr	Ile	Leu	Leu	Leu	Leu	Val	Ala	Pro	Ala	Tyr	Ser		
	275					280					285						
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Phe	Asn	Cys	Leu	Gly	Met	Gly	Asn	Arg	Asp	Phe	Ile	Glu	Gly	Ala	Ser		
	290					295				300							
ggg	gcc	act	tgg	gtg	gac	ttg	gtg	cta	gaa	gga	gac	agc	tgc	ttg	aca	1078	
Gly	Ala	Thr	Trp	Val	Asp	Leu	Val	Leu	Glu	Gly	Asp	Ser	Cys	Leu	Thr		
305				310				315						320			
atc	atg	gca	aac	gac	aaa	cca	aca	ttg	gac	gtc	cgc	atg	att	aac	atc	1126	
Ile	Met	Ala	Asn	Asp	Lys	Pro	Thr	Leu	Asp	Val	Arg	Met	Ile	Asn	Ile		
			325					330					335				
gaa	gct	agc	caa	ctt	gct	gag	gtc	aga	agt	tac	tgc	tat	cat	gct	tca	1174	
Glu	Ala	Ser	Gln	Leu	Ala	Glu	Val	Arg	Ser	Tyr	Cys	Tyr	His	Ala	Ser		
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gtc	act	gac	atc	tcg	acg	gtg	gct	cgg	tgc	ccc	acg	act	gga	gaa	gcc	1222	
Val	Thr	Asp	Ile	Ser	Thr	Val	Ala	Arg	Cys	Pro	Thr	Thr	Gly	Glu	Ala		
	355					360						365					
cac	aac	gag	aag	cga	gct	gat	agt	agc	tat	gtg	tgc	aaa	caa	ggc	ttc	1270	
His	Asn	Glu	Lys	Arg	Ala	Asp	Ser	Ser	Tyr	Val	Cys	Lys	Gln	Gly	Phe		
	370				375					380							

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Thr Asp Arg Gly Trp Gly Asn Gly Cys Gly Phe Phe Gly Lys Gly Ser	
385 390 395 400	
att gac aca tgt gca aaa ttc tcc tgc acc agt aaa gcg att ggg aga	1366
Ile Asp Thr Cys Ala Lys Phe Ser Cys Thr Ser Lys Ala Ile Gly Arg	
405 410 415	
aca atc cag cca gaa aac atc aaa tac aaa gtt ggc att ttt gtg cat	1414
Thr Ile Gln Pro Glu Asn Ile Lys Tyr Lys Val Gly Ile Phe Val His	
420 425 430	
gga acc acc act tcg gaa aac cat ggg aat tat tca gcg caa gtt ggg	1462
Gly Thr Thr Thr Ser Glu Asn His Gly Asn Tyr Ser Ala Gln Val Gly	
435 440 445	
gcg tcc cag gcg gca aag ttt aca gta aca ccc aat gct cct tcg gta	1510
Ala Ser Gln Ala Ala Lys Phe Thr Val Thr Pro Asn Ala Pro Ser Val	
450 455 460	
gcc ctc aaa ctt ggt gac tac gga gaa gtc aca ctg gac tgt gag cca	1558
Ala Leu Lys Leu Gly Asp Tyr Gly Glu Val Thr Leu Asp Cys Glu Pro	
465 470 475 480	
agg agt gga ctg aac act gaa gcg ttt tac gtc atg acc gtg ggg tca	1606
Arg Ser Gly Leu Asn Thr Glu Ala Phe Tyr Val Met Thr Val Gly Ser	
485 490 495	
aag tca ttt ctg gtc cat agg gag tgg ttt cat gac ctc gct ctc ccc	1654
Lys Ser Phe Leu Val His Arg Glu Trp Phe His Asp Leu Ala Leu Pro	
500 505 510	
tgg acg tcc cct tcg agc aca gcg tgg aga aac aga gaa ctc ctc atg	1702
Trp Thr Ser Pro Ser Ser Thr Ala Trp Arg Asn Arg Glu Leu Leu Met	
515 520 525	
gaa ttt gaa ggg gcg cac gcc aca aaa cag tcc gtt gtt gct ctt ggg	1750
Glu Phe Glu Gly Ala His Ala Thr Lys Gln Ser Val Val Ala Leu Gly	
530 535 540	
tca cag gaa gga ggc ctc cat cat gcg ttg gca gga gcc atc gtg gtg	1798
Ser Gln Glu Gly Gly Leu His His Ala Leu Ala Gly Ala Ile Val Val	
545 550 555 560	
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Glu Tyr Ser Ser Ser Val Met Leu Thr Ser Gly His Leu Lys Cys Arg	
565 570 575	
ctg aaa atg gac aaa ctg gct ctg aaa ggc aca acc tat ggc atg tgt	1894
Leu Lys Met Asp Lys Leu Ala Leu Lys Gly Thr Thr Tyr Gly Met Cys	
580 585 590	

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Thr Glu Lys Phe Ser Phe Ala Lys Asn Pro Val Asp Thr Gly His Gly	
595 600 605	
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Ile Pro Ile Val Ser Val Ala Ser Leu Asn Asp Met Thr Pro Val Gly	
625 630 635 640	
cgg ctg gtg aca gtg aac ccc ttc gtc gcg act tcc agt gcc aac tca	2086
Arg Leu Val Thr Val Asn Pro Phe Val Ala Thr Ser Ser Ala Asn Ser	
645 650 655	
aag gtg ctg gtc gag atg gaa ccc ccc ttc gga gac tcc tac atc gta	2134
Lys Val Leu Val Glu Met Glu Pro Phe Gly Asp Ser Tyr Ile Val	
660 665 670	
gtt gga agg gga gac aag cag atc aac cac cat tgg cac aaa gct gga	2182
Val Gly Arg Gly Asp Lys Gln Ile Asn His His Trp His Lys Ala Gly	
675 680 685	
agc acg ctg ggc aag gcc ttt tca aca act ttg aag gga gct caa aga	2230
Ser Thr Leu Gly Lys Ala Phe Ser Thr Thr Leu Lys Gly Ala Gln Arg	
690 695 700	
ctg gca gcg ttg ggc gac aca gcc tgg gac ttt ggc tct att gga ggg	2278
Leu Ala Ala Leu Gly Asp Thr Ala Trp Asp Phe Gly Ser Ile Gly Gly	
705 710 715 720	
gtc ttc aac tcc ata gga aga gcc gtt cac caa gtg ttt ggt ggt gcc	2326
Val Phe Asn Ser Ile Gly Arg Ala Val His Gln Val Phe Gly Gly Ala	
725 730 735	
ttc aga aca ctc ttt ggg gga atg tct tgg atc aca caa ggg cta atg	2374
Phe Arg Thr Leu Phe Gly Gly Met Ser Trp Ile Thr Gln Gly Leu Met	
740 745 750	
ggt gcc cta ctg ctc tgg atg ggc gtc aac gca cga gac cga tca att	2422
Gly Ala Leu Leu Leu Trp Met Gly Val Asn Ala Arg Asp Arg Ser Ile	
755 760 765	
gct ttg gcc ttc tta gcc aca gga ggt gtg ctc gtg ttc tta gcg acc	2470
Ala Leu Ala Phe Leu Ala Thr Gly Gly Val Leu Val Phe Leu Ala Thr	
770 775 780	
aat gtg ggc gcc gat caa gga tgc gcc atc aac ttt ggc aag aga gag	2518
Asn Val Gly Ala Asp Gln Gly Cys Ala Ile Asn Phe Gly Lys Arg Glu	

785	790	795	800	
ctc aag tgc gga gat ggt atc ttc ata ttt aga gac tct gat gac tgg				2566
Leu Lys Cys Gly Asp Gly Ile Phe Ile Phe Arg Asp Ser Asp Asp Trp				
	805	810	815	
ctg aac aag tac tca tac tat cca gaa gat cct gtg aag ctt gca tca				2614
Leu Asn Lys Tyr Ser Tyr Tyr Pro Glu Asp Pro Val Lys Leu Ala Ser				
	820	825	830	
ata gtg aaa gcc tct ttt gaa gaa ggg aag tgt ggc cta aat tca gtt				2662
Ile Val Lys Ala Ser Phe Glu Glu Gly Lys Cys Gly Leu Asn Ser Val				
	835	840	845	
gac tcc ctt gag cat gag atg tgg aga agc agg gca gat gag atc aat				2710
Asp Ser Leu Glu His Glu Met Trp Arg Ser Arg Ala Asp Glu Ile Asn				
	850	855	860	
gcc att ttt gag gaa aac gag gtg gac att tct gtt gtc gtg cag gat				2758
Ala Ile Phe Glu Glu Asn Glu Val Asp Ile Ser Val Val Val Gln Asp				
	865	870	875	880
cca aag aat gtt tac cag aga gga act cat cca ttt tcc aga att cgg				2806
Pro Lys Asn Val Tyr Gln Arg Gly Thr His Pro Phe Ser Arg Ile Arg				
	885	890	895	
gat ggt ctg cag tat ggt tgg aag act tgg ggt aag aac ctt gtg ttc				2854
Asp Gly Leu Gln Tyr Gly Trp Lys Thr Trp Gly Lys Asn Leu Val Phe				
	900	905	910	
tcc cca ggg agg aag aat gga agc ttc atc ata gat gga aag tcc agg				2902
Ser Pro Gly Arg Lys Asn Gly Ser Phe Ile Ile Asp Gly Lys Ser Arg				
	915	920	925	
aaa gaa tgc ccg ttt tca aac cgg gtc tgg aat tct ttc cag ata gag				2950
Lys Glu Cys Pro Phe Ser Asn Arg Val Trp Asn Ser Phe Gln Ile Glu				
	930	935	940	
gag ttt ggg acg gga gtg ttc acc aca cgc gtg tac atg gac gca gtc				2998
Glu Phe Gly Thr Gly Val Phe Thr Thr Arg Val Tyr Met Asp Ala Val				
	945	950	955	960
ttt gaa tac acc ata gac tgc gat gga tct atc ttg ggt gca gcg gtg				3046
Phe Glu Tyr Thr Ile Asp Cys Asp Gly Ser Ile Leu Gly Ala Ala Val				
	965	970	975	
aac gga aaa aag agt gcc cat ggc tct cca aca ttt tgg atg gga agt				3094
Asn Gly Lys Lys Ser Ala His Gly Ser Pro Thr Phe Trp Met Gly Ser				
	980	985	990	
cat gaa gta aat ggg aca tgg atg atc cac acc ttg gag gca tta gat				3142

His	Glu	Val	Asn	Gly	Thr	Trp	Met	Ile	His	Thr	Leu	Glu	Ala	Leu	Asp		
		995					1000					1005					
tac	aag	gag	tgt	gag	tgg	cca	ctg	aca	cat	acg	att	gga	aca	tca	gtt	3190	
Tyr	Lys	Glu	Cys	Glu	Trp	Pro	Leu	Thr	His	Thr	Ile	Gly	Thr	Ser	Val		
	1010					1015					1020						
gaa	gag	agt	gaa	atg	ttc	atg	ccg	aga	tca	atc	gga	ggc	cca	gtt	agc	3238	
Glu	Glu	Ser	Glu	Met	Phe	Met	Pro	Arg	Ser	Ile	Gly	Gly	Pro	Val	Ser		
1025					1030					1035					1040		
tct	cac	aat	cat	atc	cct	gga	tac	aag	gtt	cag	acg	aac	gga	cct	tgg	3286	
Ser	His	Asn	His	Ile	Pro	Gly	Tyr	Lys	Val	Gln	Thr	Asn	Gly	Pro	Trp		
				1045					1050					1055			
atg	cag	gta	cca	cta	gaa	gtg	aag	aga	gaa	gct	tgc	cca	ggg	act	agc	3334	
Met	Gln	Val	Pro	Leu	Glu	Val	Lys	Arg	Glu	Ala	Cys	Pro	Gly	Thr	Ser		
			1060					1065					1070				
gtg	atc	att	gat	ggc	aac	tgt	gat	gga	cgg	gga	aaa	tca	acc	aga	tcc	3382	
Val	Ile	Ile	Asp	Gly	Asn	Cys	Asp	Gly	Arg	Gly	Lys	Ser	Thr	Arg	Ser		
	1075					1080						1085					
acc	acg	gat	agc	ggg	aaa	gtt	att	cct	gaa	tgg	tgt	tgc	cgc	tcc	tgc	3430	
Thr	Thr	Asp	Ser	Gly	Lys	Val	Ile	Pro	Glu	Trp	Cys	Cys	Arg	Ser	Cys		
	1090					1095					1100						
aca	atg	ccg	cct	gtg	agc	ttc	cat	ggg	agt	gat	ggg	tgt	tgg	tat	ccc	3478	
Thr	Met	Pro	Pro	Val	Ser	Phe	His	Gly	Ser	Asp	Gly	Cys	Trp	Tyr	Pro		
1105					1110					1115					1120		
atg	gaa	att	agg	cca	agg	aaa	acg	cat	gaa	agc	cat	ctg	gtg	cgc	tcc	3526	
Met	Glu	Ile	Arg	Pro	Arg	Lys	Thr	His	Glu	Ser	His	Leu	Val	Arg	Ser		
				1125				1130					1135				
tgg	gtt	aca	gct	gga	gaa	ata	cat	gct	gtc	cct	ttt	ggg	ttg	gtg	agc	3574	
Trp	Val	Thr	Ala	Gly	Glu	Ile	His	Ala	Val	Pro	Phe	Gly	Leu	Val	Ser		
			1140					1145					1150				
atg	atg	ata	gca	atg	gaa	gtg	gtc	cta	agg	aaa	aga	cag	gga	cca	aag	3622	
Met	Met	Ile	Ala	Met	Glu	Val	Val	Leu	Arg	Lys	Arg	Gln	Gly	Pro	Lys		
		1155					1160					1165					
caa	atg	ttg	gtt	gga	gga	gta	gtg	ctc	ttg	gga	gca	atg	ctg	gtc	ggg	3670	
Gln	Met	Leu	Val	Gly	Gly	Val	Val	Leu	Leu	Gly	Ala	Met	Leu	Val	Gly		
	1170					1175					1180						
caa	gta	act	ctc	ctt	gat	ttg	ctg	aaa	ctc	aca	gtg	gct	gtg	gga	ttg	3718	
Gln	Val	Thr	Leu	Leu	Asp	Leu	Leu	Lys	Leu	Thr	Val	Ala	Val	Gly	Leu		
1185					1190					1195					1200		

cat ttc cat gag atg aac aat gga gga gac gcc atg tat atg gcg ttg	3766
His Phe His Glu Met Asn Asn Gly Gly Asp Ala Met Tyr Met Ala Leu	
1205 1210 1215	
att gct gcc ttt tca atc aga cca ggg ctg ctc atc ggc ttt ggg ctc	3814
Ile Ala Ala Phe Ser Ile Arg Pro Gly Leu Leu Ile Gly Phe Gly Leu	
1220 1225 1230	
agg acc cta tgg agc cct cgg gaa cgc ctt gtg ctg acc cta gga gca	3862
Arg Thr Leu Trp Ser Pro Arg Glu Arg Leu Val Leu Thr Leu Gly Ala	
1235 1240 1245	
gcc atg gtg gag att gcc ttg ggt ggc gtg atg ggc ggc ctg tgg aag	3910
Ala Met Val Glu Ile Ala Leu Gly Gly Val Met Gly Gly Leu Trp Lys	
1250 1255 1260	
tat cta aat gca gtt tct ctc tgc atc ctg aca ata aat gct gtt gct	3958
Tyr Leu Asn Ala Val Ser Leu Cys Ile Leu Thr Ile Asn Ala Val Ala	
1265 1270 1275 1280	
tct agg aaa gca tca aat acc atc ttg ccc ctc atg gct ctg ttg aca	4006
Ser Arg Lys Ala Ser Asn Thr Ile Leu Pro Leu Met Ala Leu Leu Thr	
1285 1290 1295	
cct gtc act atg gct gag gtg aga ctt gcc gca atg ttc ttt tgt gcc	4054
Pro Val Thr Met Ala Glu Val Arg Leu Ala Ala Met Phe Phe Cys Ala	
1300 1305 1310	
atg gtt atc ata ggg gtc ctt cac cag aat ttc aag gac acc tcc atg	4102
Met Val Ile Ile Gly Val Leu His Gln Asn Phe Lys Asp Thr Ser Met	
1315 1320 1325	
cag aag act ata cct ctg gtg gcc ctc aca ctc aca tct tac ctg ggc	4150
Gln Lys Thr Ile Pro Leu Val Ala Leu Thr Leu Thr Ser Tyr Leu Gly	
1330 1335 1340	
ttg aca caa cct ttt ttg ggc ctg tgt gca ttt ctg gca acc cgc ata	4198
Leu Thr Gln Pro Phe Leu Gly Leu Cys Ala Phe Leu Ala Thr Arg Ile	
1345 1350 1355 1360	
ttt ggg cga agg agt atc cca gtg aat gag gca ctc gca gca gct ggt	4246
Phe Gly Arg Arg Ser Ile Pro Val Asn Glu Ala Leu Ala Ala Ala Gly	
1365 1370 1375	
cta gtg gga gtg ctg gca gga ctg gct ttt cag gag atg gag aac ttc	4294
Leu Val Gly Val Leu Ala Gly Leu Ala Phe Gln Glu Met Glu Asn Phe	
1380 1385 1390	
ctt ggt ccg att gca gtt gga gga ctc ctg atg atg ctg gtt agc gtg	4342
Leu Gly Pro Ile Ala Val Gly Gly Leu Leu Met Met Leu Val Ser Val	
1395 1400 1405	

gct ggg agg gtg gat ggg cta gag ctc aag aag ctt ggt gaa gtt tca	4390
Ala Gly Arg Val Asp Gly Leu Glu Leu Lys Lys Leu Gly Glu Val Ser	
1410 1415 1420	
tgg gaa gag gag gcg gag atc agc ggg agt tcc gcc cgc tat gat gtg	4438
Trp Glu Glu Glu Ala Glu Ile Ser Gly Ser Ser Ala Arg Tyr Asp Val	
1425 1430 1435 1440	
gca ctc agt gaa caa ggg gag ttc aag ctg ctt tct gaa gag aaa gtg	4486
Ala Leu Ser Glu Gln Gly Glu Phe Lys Leu Leu Ser Glu Glu Lys Val	
1445 1450 1455	
cca tgg gac cag gtt gtg atg acc tcg ctg gcc ttg gtt ggg gct gcc	4534
Pro Trp Asp Gln Val Val Met Thr Ser Leu Ala Leu Val Gly Ala Ala	
1460 1465 1470	
ctc cat cca ttt gct ctt ctg ctg gtc ctt gct ggg tgg ctg ttt cat	4582
Leu His Pro Phe Ala Leu Leu Val Leu Ala Gly Trp Leu Phe His	
1475 1480 1485	
gtc agg gga gct agg aga agt ggg gat gtc ttg tgg gat att ccc act	4630
Val Arg Gly Ala Arg Arg Ser Gly Asp Val Leu Trp Asp Ile Pro Thr	
1490 1495 1500	
cct aag atc atc gag gaa tgt gaa cat ctg gag gat ggg att tat ggc	4678
Pro Lys Ile Ile Glu Glu Cys Glu His Leu Glu Asp Gly Ile Tyr Gly	
1505 1510 1515 1520	
ata ttc cag tca acc ttc ttg ggg gcc tcc cag cga gga gtg gga gtg	4726
Ile Phe Gln Ser Thr Phe Leu Gly Ala Ser Gln Arg Gly Val Gly Val	
1525 1530 1535	
gca cag gga ggg gtg ttc cac aca atg tgg cat gtc aca aga gga gct	4774
Ala Gln Gly Gly Val Phe His Thr Met Trp His Val Thr Arg Gly Ala	
1540 1545 1550	
ttc ctt gtc agg aat ggc aag aag ttg att cca tct tgg gct tca gta	4822
Phe Leu Val Arg Asn Gly Lys Lys Leu Ile Pro Ser Trp Ala Ser Val	
1555 1560 1565	
aag gaa gac ctt gtc gcc tat ggt ggc tca tgg aag ttg gaa ggc aga	4870
Lys Glu Asp Leu Val Ala Tyr Gly Gly Ser Trp Lys Leu Glu Gly Arg	
1570 1575 1580	
tgg gat gga gag gaa gag gtc cag ttg atc gcg gct gtt cca gga aag	4918
Trp Asp Gly Glu Glu Glu Val Gln Leu Ile Ala Ala Val Pro Gly Lys	
1585 1590 1595 1600	
aac gtg gtc aac gtc cag aca aaa ccg agc ttg ttc aaa gtg agg aat	4966
Asn Val Val Asn Val Gln Thr Lys Pro Ser Leu Phe Lys Val Arg Asn	

1605	1610	1615	
ggg gga gaa atc ggg gct gtc gct ctt gac tat ccg agt ggc act tca			5014
Gly Gly Glu Ile Gly Ala Val Ala Leu Asp Tyr Pro Ser Gly Thr Ser			
1620	1625	1630	
gga tct cct att gtt aac agg aac gga gag gtg att ggg ctg tac ggc			5062
Gly Ser Pro Ile Val Asn Arg Asn Gly Glu Val Ile Gly Leu Tyr Gly			
1635	1640	1645	
aat ggc atc ctt gtc ggt gac aac tcc ttc gtg tcc gcc ata tcc cag			5110
Asn Gly Ile Leu Val Gly Asp Asn Ser Phe Val Ser Ala Ile Ser Gln			
1650	1655	1660	
act gag gtg aag gaa gaa gga aag gag gag ctc caa gag atc ccg aca			5158
Thr Glu Val Lys Glu Glu Gly Lys Glu Glu Leu Gln Glu Ile Pro Thr			
1665	1670	1675	1680
atg cta aag aaa gga atg aca act gtc ctt gat ttt cat cct gga gct			5206
Met Leu Lys Lys Gly Met Thr Thr Val Leu Asp Phe His Pro Gly Ala			
1685	1690	1695	
ggg aag aca aga cgt ttc ctc cca cag atc ttg gcc gag tgc gca cgg			5254
Gly Lys Thr Arg Arg Phe Leu Pro Gln Ile Leu Ala Glu Cys Ala Arg			
1700	1705	1710	
aga cgc ttg cgc act ctt gtg ttg gcc ccc acc agg gtt gtt ctt tct			5302
Arg Arg Leu Arg Thr Leu Val Leu Ala Pro Thr Arg Val Val Leu Ser			
1715	1720	1725	
gaa atg aag gag gct ttt cac ggc ctg gac gtg aaa ttc cac aca cag			5350
Glu Met Lys Glu Ala Phe His Gly Leu Asp Val Lys Phe His Thr Gln			
1730	1735	1740	
gct ttt tcc gct cac ggc agc ggg aga gaa gtc att gat gcc atg tgc			5398
Ala Phe Ser Ala His Gly Ser Gly Arg Glu Val Ile Asp Ala Met Cys			
1745	1750	1755	1760
cat gcc acc cta act tac agg atg ttg gaa cca act agg gtt gtt aac			5446
His Ala Thr Leu Thr Tyr Arg Met Leu Glu Pro Thr Arg Val Val Asn			
1765	1770	1775	
tgg gaa gtg atc att atg gat gaa gcc cat ttt ttg gat cca gct agc			5494
Trp Glu Val Ile Ile Met Asp Glu Ala His Phe Leu Asp Pro Ala Ser			
1780	1785	1790	
ata gcc gct aga ggt tgg gca gcg cac aga gct agg gca aat gaa agt			5542
Ile Ala Ala Arg Gly Trp Ala Ala His Arg Ala Arg Ala Asn Glu Ser			
1795	1800	1805	
gca aca atc ttg atg aca gcc aca ccg cct ggg act agt gat gaa ttt			5590

Ala Thr Ile Leu Met Thr	Ala Thr Pro Pro Gly Thr Ser Asp Glu Phe	
1810	1815	1820
cca cat tca aat ggt gaa ata gaa gat gtt caa acg gac ata ccc agt		5638
Pro His Ser Asn Gly Glu Ile Glu Asp Val Gln Thr Asp Ile Pro Ser		
1825	1830	1835 1840
gag ccc tgg aac aca ggg cat gac tgg atc ctg gct gac aaa agg ccc		5686
Glu Pro Trp Asn Thr Gly His Asp Trp Ile Leu Ala Asp Lys Arg Pro		
1845	1850	1855
acg gca tgg ttc ctt cca tcc atc aga gct gca aat gtc atg gct gcc		5734
Thr Ala Trp Phe Leu Pro Ser Ile Arg Ala Ala Asn Val Met Ala Ala		
1860	1865	1870
tct ttg cgt aag gct gga aag agt gtg gtg gtc ctg aac agg aaa acc		5782
Ser Leu Arg Lys Ala Gly Lys Ser Val Val Val Leu Asn Arg Lys Thr		
1875	1880	1885
ttt gag aga gaa tac ccc acg ata aag cag aag aaa cct gac ttt ata		5830
Phe Glu Arg Glu Tyr Pro Thr Ile Lys Gln Lys Lys Pro Asp Phe Ile		
1890	1895	1900
ttg gcc act gac ata gct gaa atg gga gcc aac ctt tgc gtg gag cga		5878
Leu Ala Thr Asp Ile Ala Glu Met Gly Ala Asn Leu Cys Val Glu Arg		
1905	1910	1915 1920
gtg ctg gat tgc agg acg gct ttt aag cct gtg ctt gtg gat gaa ggg		5926
Val Leu Asp Cys Arg Thr Ala Phe Lys Pro Val Leu Val Asp Glu Gly		
1925	1930	1935
agg aag gtg gca ata aaa ggg cca ctt cgt atc tcc gca tcc tct gct		5974
Arg Lys Val Ala Ile Lys Gly Pro Leu Arg Ile Ser Ala Ser Ser Ala		
1940	1945	1950
gct caa agg agg ggg cgc att ggg aga aat ccc aac aga gat gga gac		6022
Ala Gln Arg Arg Gly Arg Ile Gly Arg Asn Pro Asn Arg Asp Gly Asp		
1955	1960	1965
tca tac tac tat tct gag cct aca agt gaa aat aat gcc cac cac gtc		6070
Ser Tyr Tyr Tyr Ser Glu Pro Thr Ser Glu Asn Asn Ala His His Val		
1970	1975	1980
tgc tgg ttg gag gcc tca atg ctc ttg gac aac atg gag gtg agg ggt		6118
Cys Trp Leu Glu Ala Ser Met Leu Leu Asp Asn Met Glu Val Arg Gly		
1985	1990	1995 2000
gga atg gtc gcc cca ctc tat ggc gtt gaa gga act aaa aca cca gtt		6166
Gly Met Val Ala Pro Leu Tyr Gly Val Glu Gly Thr Lys Thr Pro Val		
2005	2010	2015

tcc cct ggt gaa atg aga ctg agg gat gac cag agg aaa gtc ttc aga	6214
Ser Pro Gly Glu Met Arg Leu Arg Asp Asp Gln Arg Lys Val Phe Arg	
2020 2025 2030	
gaa cta gtg agg aat tgt gac ctg ccc gtt tgg ctt tcg tgg caa gtg	6262
Glu Leu Val Arg Asn Cys Asp Leu Pro Val Trp Leu Ser Trp Gln Val	
2035 2040 2045	
gcc aag gct ggt ttg aag acg aat gat cgt aag tgg tgt ttt gaa ggc	6310
Ala Lys Ala Gly Leu Lys Thr Asn Asp Arg Lys Trp Cys Phe Glu Gly	
2050 2055 2060	
cct gag gaa cat gag atc ttg aat gac agc ggt gaa aca gtg aag tgc	6358
Pro Glu Glu His Glu Ile Leu Asn Asp Ser Gly Glu Thr Val Lys Cys	
2065 2070 2075 2080	
agg gct cct gga gga gca aag aag cct ctg cgc cca agg tgg tgt gat	6406
Arg Ala Pro Gly Gly Ala Lys Lys Pro Leu Arg Pro Arg Trp Cys Asp	
2085 2090 2095	
gaa agg gtg tca tct gac cag agt gcg ctg tct gaa ttt att aag ttt	6454
Glu Arg Val Ser Ser Asp Gln Ser Ala Leu Ser Glu Phe Ile Lys Phe	
2100 2105 2110	
gct gaa ggt agg agg gga gct gct gaa gtg cta gtt gtg ctg agt gaa	6502
Ala Glu Gly Arg Arg Gly Ala Ala Glu Val Leu Val Val Leu Ser Glu	
2115 2120 2125	
ctc cct gat ttc ctg gct aaa aaa ggt gga gag gca atg gat acc atc	6550
Leu Pro Asp Phe Leu Ala Lys Lys Gly Gly Glu Ala Met Asp Thr Ile	
2130 2135 2140	
agt gtg ttc ctc cac tct gag gaa ggc tct agg gct tac cgc aat gca	6598
Ser Val Phe Leu His Ser Glu Glu Gly Ser Arg Ala Tyr Arg Asn Ala	
2145 2150 2155 2160	
cta tca atg atg cct gag gca atg aca ata gtc atg ctg ttt ata ctg	6646
Leu Ser Met Met Pro Glu Ala Met Thr Ile Val Met Leu Phe Ile Leu	
2165 2170 2175	
gct gga cta ctg aca tcg gga atg gtc atc ttt ttc atg tct ccc aaa	6694
Ala Gly Leu Leu Thr Ser Gly Met Val Ile Phe Phe Met Ser Pro Lys	
2180 2185 2190	
ggc atc agt aga atg tct atg gcg atg ggc aca atg gcc ggc tgt gga	6742
Gly Ile Ser Arg Met Ser Met Ala Met Gly Thr Met Ala Gly Cys Gly	
2195 2200 2205	
tat ctc atg ttc ctt gga ggc gtc aaa ccc act cac atc tcc tat gtc	6790
Tyr Leu Met Phe Leu Gly Gly Val Lys Pro Thr His Ile Ser Tyr Val	
2210 2215 2220	

atg	ctc	ata	ttc	ttt	gtc	ctg	atg	gtg	gtt	gtg	atc	ccc	gag	cca	ggg	6838
Met	Leu	Ile	Phe	Phe	Val	Leu	Met	Val	Val	Val	Ile	Pro	Glu	Pro	Gly	
2225					2230					2235					2240	
caa	caa	agg	tcc	atc	caa	gac	aac	caa	gtg	gca	tac	ctc	att	att	ggc	6886
Gln	Gln	Arg	Ser	Ile	Gln	Asp	Asn	Gln	Val	Ala	Tyr	Leu	Ile	Ile	Gly	
				2245				2250							2255	
atc	ctg	acg	ctg	gtt	tca	gcg	gtg	gca	gcc	aac	gag	cta	ggc	atg	ctg	6934
Ile	Leu	Thr	Leu	Val	Ser	Ala	Val	Ala	Ala	Asn	Glu	Leu	Gly	Met	Leu	
				2260				2265							2270	
gag	aaa	acc	aaa	gag	gac	ctc	ttt	ggg	aag	aag	aac	tta	att	cca	tct	6982
Glu	Lys	Thr	Lys	Glu	Asp	Leu	Phe	Gly	Lys	Lys	Asn	Leu	Ile	Pro	Ser	
				2275			2280									
agt	gct	tca	ccc	tgg	agt	tgg	ccg	gat	ctt	gac	ctg	aag	cca	gga	gct	7030
Ser	Ala	Ser	Pro	Trp	Ser	Trp	Pro	Asp	Leu	Asp	Leu	Lys	Pro	Gly	Ala	
				2290			2295									
gcc	tgg	aca	gtg	tac	gtt	ggc	att	gtt	aca	atg	ctc	tct	cca	atg	ttg	7078
Ala	Trp	Thr	Val	Tyr	Val	Gly	Ile	Val	Thr	Met	Leu	Ser	Pro	Met	Leu	
2305					2310					2315					2320	
cac	cac	tgg	atc	aaa	gtc	gaa	tat	ggc	aac	ctg	tct	ctg	tct	gga	ata	7126
His	His	Trp	Ile	Lys	Val	Glu	Tyr	Gly	Asn	Leu	Ser	Leu	Ser	Gly	Ile	
				2325				2330							2335	
gcc	cag	tca	gcc	tca	gtc	ctt	tct	ttc	atg	gac	aag	ggg	ata	cca	ttc	7174
Ala	Gln	Ser	Ala	Ser	Val	Leu	Ser	Phe	Met	Asp	Lys	Gly	Ile	Pro	Phe	
				2340				2345							2350	
atg	aag	atg	aat	atc	tcg	gtc	ata	atg	ctg	ctg	gtc	agt	ggc	tgg	aat	7222
Met	Lys	Met	Asn	Ile	Ser	Val	Ile	Met	Leu	Leu	Val	Ser	Gly	Trp	Asn	
				2355			2360								2365	
tca	ata	aca	gtg	atg	cct	ctg	ctc	tgt	ggc	ata	ggg	tgc	gcc	atg	ctc	7270
Ser	Ile	Thr	Val	Met	Pro	Leu	Leu	Cys	Gly	Ile	Gly	Cys	Ala	Met	Leu	
				2370			2375					2380				
cac	tgg	tct	ctc	att	tta	cct	gga	atc	aaa	gcg	cag	cag	tca	aag	ctt	7318
His	Trp	Ser	Leu	Ile	Leu	Pro	Gly	Ile	Lys	Ala	Gln	Gln	Ser	Lys	Leu	
2385					2390					2395					2400	
gca	cag	aga	agg	gtg	ttc	cat	ggc	gtt	gcc	aag	aac	cct	gtg	gtt	gat	7366
Ala	Gln	Arg	Arg	Val	Phe	His	Gly	Val	Ala	Lys	Asn	Pro	Val	Val	Asp	
				2405				2410							2415	
ggg	aat	cca	aca	gtt	gac	att	gag	gaa	gct	cct	gaa	atg	cct	gcc	ctt	7414
Gly	Asn	Pro	Thr	Val	Asp	Ile	Glu	Glu	Ala	Pro	Glu	Met	Pro	Ala	Leu	

2420	2425	2430	
tat gag aag aaa ctg gct cta	tat ctc ctt ctt gct ctc agc cta gct		7462
Tyr Glu Lys Lys Leu Ala Leu	Tyr Leu Leu Leu Ala Leu Ser Leu Ala		
2435	2440	2445	
tct gtt gcc atg tgc aga acg ccc ttt tca ttg gct gaa ggc att gtc			7510
Ser Val Ala Met Cys Arg Thr Pro Phe Ser Leu Ala Glu Gly Ile Val			
2450	2455	2460	
cta gca tca gct gcc tta ggg ccg ctc ata gag gga aac acc agc ctt			7558
Leu Ala Ser Ala Ala Leu Gly Pro Leu Ile Glu Gly Asn Thr Ser Leu			
2465	2470	2475	2480
ctt tgg aat gga ccc atg gct gtc tcc atg aca gga gtc atg agg ggg			7606
Leu Trp Asn Gly Pro Met Ala Val Ser Met Thr Gly Val Met Arg Gly			
2485	2490	2495	
aat cac tat gct ttt gtg gga gtc atg tac aat cta tgg aag atg aaa			7654
Asn His Tyr Ala Phe Val Gly Val Met Tyr Asn Leu Trp Lys Met Lys			
2500	2505	2510	
act gga cgc cgg ggg agc gcg aat gga aaa act ttg ggt gaa gtc tgg			7702
Thr Gly Arg Arg Gly Ser Ala Asn Gly Lys Thr Leu Gly Glu Val Trp			
2515	2520	2525	
aag agg gaa ctg aat ctg ttg gac aag cga cag ttt gag ttg tat aaa			7750
Lys Arg Glu Leu Asn Leu Leu Asp Lys Arg Gln Phe Glu Leu Tyr Lys			
2530	2535	2540	
agg acc gac att gtg gag gtg gat cgt gat acg gca cgc agg cat ttg			7798
Arg Thr Asp Ile Val Glu Val Asp Arg Asp Thr Ala Arg Arg His Leu			
2545	2550	2555	2560
gcc gaa ggg aag gtg gac acc ggg gtg gcg gtc tcc agg ggg acc gca			7846
Ala Glu Gly Lys Val Asp Thr Gly Val Ala Val Ser Arg Gly Thr Ala			
2565	2570	2575	
aag tta agg tgg ttc cat gag cgt ggc tat gtc aag ctg gaa ggt agg			7894
Lys Leu Arg Trp Phe His Glu Arg Gly Tyr Val Lys Leu Glu Gly Arg			
2580	2585	2590	
gtg att gac ctg ggg tgt ggc cgc gga ggc tgg tgt tac tac gct gct			7942
Val Ile Asp Leu Gly Cys Gly Arg Gly Gly Trp Cys Tyr Tyr Ala Ala			
2595	2600	2605	
gcg caa aag gaa gtg agt ggg gtc aaa gga ttt act ctt gga aga gac			7990
Ala Gln Lys Glu Val Ser Gly Val Lys Gly Phe Thr Leu Gly Arg Asp			
2610	2615	2620	
ggc cat gag aaa ccc atg aat gtg caa agt ctg gga tgg aac atc atc			8038

Gly His Glu Lys Pro Met Asn Val Gln Ser Leu Gly Trp Asn Ile Ile	
2625	2630 2635 2640
acc ttc aag gac aaa act gat atc cac cgc cta gaa cca gtg aaa tgt	8086
Thr Phe Lys Asp Lys Thr Asp Ile His Arg Leu Glu Pro Val Lys Cys	
2645 2650 2655	
gac acc ctt ttg tgt gac att gga gag tca tca tcg tca tcg gtc aca	8134
Asp Thr Leu Leu Cys Asp Ile Gly Glu Ser Ser Ser Ser Ser Val Thr	
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Glu Gly Glu Arg Thr Val Arg Val Leu Asp Thr Val Glu Lys Trp Leu	
2675 2680 2685	
gct tgt ggg gtt gac aac ttc tgt gtg aag gtg tta gct cca tac atg	8230
Ala Cys Gly Val Asp Asn Phe Cys Val Lys Val Leu Ala Pro Tyr Met	
2690 2695 2700	
cca gat gtt ctt gag aaa ctg gaa ttg ctc caa agg agg ttt ggc gga	8278
Pro Asp Val Leu Glu Lys Leu Glu Leu Leu Gln Arg Arg Phe Gly Gly	
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aca gtg atc agg aac cct ctc tcc agg aat tcc act cat gaa atg tac	8326
Thr Val Ile Arg Asn Pro Leu Ser Arg Asn Ser Thr His Glu Met Tyr	
2725 2730 2735	
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Tyr Val Ser Gly Ala Arg Ser Asn Val Thr Phe Thr Val Asn Gln Thr	
2740 2745 2750	
tcc cgc ctc ctg atg agg aga atg agg cgt cca act gga aaa gtg acc	8422
Ser Arg Leu Leu Met Arg Arg Met Arg Arg Pro Thr Gly Lys Val Thr	
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ctg gag gct gac gtc atc ctc cca att ggg aca cgc agt gtt gag aca	8470
Leu Glu Ala Asp Val Ile Leu Pro Ile Gly Thr Arg Ser Val Glu Thr	
2770 2775 2780	
gac aag gga ccc ctg gac aaa gag gcc ata gaa gaa agg gtt gag agg	8518
Asp Lys Gly Pro Leu Asp Lys Glu Ala Ile Glu Glu Arg Val Glu Arg	
2785 2790 2795 2800	
ata aaa tct gag tac atg acc tct tgg ttt tat gac aat gac aac ccc	8566
Ile Lys Ser Glu Tyr Met Thr Ser Trp Phe Tyr Asp Asn Asp Asn Pro	
2805 2810 2815	
tac agg acc tgg cac tac tgt ggc tcc tat gtc aca aaa acc tcc gga	8614
Tyr Arg Thr Trp His Tyr Cys Gly Ser Tyr Val Thr Lys Thr Ser Gly	
2820 2825 2830	

agt gcg gcg agc atg gta aat ggt gtt att aaa att ctg aca tat cca	8662
Ser Ala Ala Ser Met Val Asn Gly Val Ile Lys Ile Leu Thr Tyr Pro	
2835 2840 2845	
tgg gac agg ata gag gag gtc aca aga atg gca atg act gac aca acc	8710
Trp Asp Arg Ile Glu Glu Val Thr Arg Met Ala Met Thr Asp Thr Thr	
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Pro Phe Gly Gln Gln Arg Val Phe Lys Glu Lys Val Asp Thr Arg Ala	
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Lys Asp Pro Pro Ala Gly Thr Arg Lys Ile Met Lys Val Val Asn Arg	
2885 2890 2895	
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Trp Leu Phe Arg His Leu Ala Arg Glu Lys Asn Pro Arg Leu Cys Thr	
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Tyr Leu Glu Glu Gln Glu Gln Trp Lys Thr Ala Asn Glu Ala Val Gln	
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Asp Pro Lys Phe Trp Glu Leu Val Asp Glu Glu Arg Lys Leu His Gln	
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Gln Gly Arg Cys Arg Thr Cys Val Tyr Asn Met Met Gly Lys Arg Glu	
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Lys Lys Leu Ser Glu Phe Gly Lys Ala Lys Gly Ser Arg Ala Ile Trp	
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tat atg tgg ctg gga gcg cgg tat ctt gag ttt gag gcc ctg gga ttc	9142
Tyr Met Trp Leu Gly Ala Arg Tyr Leu Glu Phe Glu Ala Leu Gly Phe	
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ctg aat gag gac cat tgg gct tcc agg gaa aac tca gga gga gga gtg	9190
Leu Asn Glu Asp His Trp Ala Ser Arg Glu Asn Ser Gly Gly Gly Val	
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gaa ggc att ggc tta caa tac cta gga tat gtg atc aga gac ctg gct	9238
Glu Gly Ile Gly Leu Gln Tyr Leu Gly Tyr Val Ile Arg Asp Leu Ala	
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gca atg gat ggt ggt gga ttc tac gcg gat gac acc gct gga tgg gac	9286
Ala Met Asp Gly Gly Gly Phe Tyr Ala Asp Asp Thr Ala Gly Trp Asp	
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acg cgc atc aca gag gca gac ctt gat gat gaa cag gag atc ttg aac	9334
Thr Arg Ile Thr Glu Ala Asp Leu Asp Asp Glu Gln Glu Ile Leu Asn	
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Tyr Met Ser Pro His His Lys Lys Leu Ala Gln Ala Val Met Glu Met	
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aca tac aag aac aaa gtg gtg aaa gtg ttg aga cca gcc cca gga ggg	9430
Thr Tyr Lys Asn Lys Val Val Lys Val Leu Arg Pro Ala Pro Gly Gly	
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aaa gcc tac atg gat gtc ata agt cga cga gac cag aga gga tcc ggg	9478
Lys Ala Tyr Met Asp Val Ile Ser Arg Arg Asp Gln Arg Gly Ser Gly	
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Gln Val Val Thr Tyr Ala Leu Asn Thr Ile Thr Asn Leu Lys Val Gln	
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Leu Ile Arg Met Ala Glu Ala Glu Met Val Ile His His Gln His Val	
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caa gat tgt gat gaa tca gtt ctg acc agg ctg gag gca tgg ctc act	9622
Gln Asp Cys Asp Glu Ser Val Leu Thr Arg Leu Glu Ala Trp Leu Thr	
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Glu His Gly Cys Asp Arg Leu Lys Arg Met Ala Val Ser Gly Asp Asp	
3170 3175 3180	
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Cys Val Val Arg Pro Ile Asp Asp Arg Phe Gly Leu Ala Leu Ser His	
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ctc aac gcc atg tcc aag gtt aga aag gac ata tct gaa tgg cag cca	9766
Leu Asn Ala Met Ser Lys Val Arg Lys Asp Ile Ser Glu Trp Gln Pro	
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Ser Lys Gly Trp Asn Asp Trp Glu Asn Val Pro Phe Cys Ser His His	
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ttc cat gaa cta cag ctg aag gat ggc agg agg att gtg gtg cct tgc	9862
Phe His Glu Leu Gln Leu Lys Asp Gly Arg Arg Ile Val Val Pro Cys	

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Arg Glu Gln Asp Glu Leu Ile Gly Arg Gly Arg Val Ser Pro Gly Asn			
3250	3255	3260	
ggc tgg atg atc aag gaa aca gct tgc ctc agc aaa gcc tat gcc aac			9958
Gly Trp Met Ile Lys Glu Thr Ala Cys Leu Ser Lys Ala Tyr Ala Asn			
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atg tgg tca ctg atg tat ttt cac aaa agg gac atg agg cta ctg tca			10006
Met Trp Ser Leu Met Tyr Phe His Lys Arg Asp Met Arg Leu Leu Ser			
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Leu Ala Val Ser Ser Ala Val Pro Thr Ser Trp Val Pro Gln Gly Arg			
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Thr Thr Trp Ser Ile His Gly Lys Gly Glu Trp Met Thr Thr Glu Asp			
3315	3320	3325	
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Met Leu Glu Val Trp Asn Arg Val Trp Ile Thr Asn Asn Pro His Met			
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Gln Asp Lys Thr Met Val Lys Lys Trp Arg Asp Val Pro Tyr Leu Thr			
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aag aga caa gac aag ctg tgc gga tca ctg att gga atg acc aat agg			10246
Lys Arg Gln Asp Lys Leu Cys Gly Ser Leu Ile Gly Met Thr Asn Arg			
3365	3370	3375	
gcc acc tgg gcc tcc cac atc cat tta gtc atc cat cgt atc cga acg			10294
Ala Thr Trp Ala Ser His Ile His Leu Val Ile His Arg Ile Arg Thr			
3380	3385	3390	
ctg att gga cag gag aaa tac act gac tac cta aca gtc atg gac agg			10342
Leu Ile Gly Gln Glu Lys Tyr Thr Asp Tyr Leu Thr Val Met Asp Arg			
3395	3400	3405	
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Tyr Ser Val Asp Ala Asp Leu Gln Leu Gly Glu Leu Ile			
3410	3415	3420	
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gggataaaaa ctacggatgg agaaccggac tccacacatt gagacagaag aagttgtcag			10571
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cggagcctcc gctaccaccc tcccacgtgg tggtagaaag acgggggtcta gaggttagag 10751
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<210> 13

<211> 3421

<212> PRT

<213> Artificial Sequence

<220>

<223> derived from Japanese Encephalitis virus and
Yellow Fever virus

<400> 13

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Gln	Ile	Gly	Asn	Arg	Pro	Gly	Pro	Ser	Arg	Gly	Val	Gln	Gly	Phe	Ile
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Phe	Phe	Phe	Leu	Phe	Asn	Ile	Leu	Thr	Gly	Lys	Lys	Ile	Thr	Ala	His
	50					55					60				
Leu	Lys	Arg	Leu	Trp	Lys	Met	Leu	Asp	Pro	Arg	Gln	Gly	Leu	Ala	Val
65					70				75						80
Leu	Arg	Lys	Val	Lys	Arg	Val	Val	Ala	Ser	Leu	Met	Arg	Gly	Leu	Ser
				85					90					95	
Ser	Arg	Lys	Arg	Arg	Ser	His	Asp	Val	Leu	Thr	Val	Gln	Phe	Leu	Ile
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Leu	Gly	Met	Leu	Leu	Met	Thr	Gly	Gly	Met	Lys	Leu	Ser	Asn	Phe	Gln
		115					120					125			
Gly	Lys	Leu	Leu	Met	Thr	Ile	Asn	Asn	Thr	Asp	Ile	Ala	Asp	Val	Ile
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Val	Ile	Pro	Thr	Ser	Lys	Gly	Glu	Asn	Arg	Cys	Trp	Val	Arg	Ala	Ile
145					150				155						160
Asp	Val	Gly	Tyr	Met	Cys	Glu	Asp	Thr	Ile	Thr	Tyr	Glu	Cys	Pro	Lys
				165				170						175	
Leu	Thr	Met	Gly	Asn	Asp	Pro	Glu	Asp	Val	Asp	Cys	Trp	Cys	Asp	Asn
			180					185					190		
Gln	Glu	Val	Tyr	Val	Gln	Tyr	Gly	Arg	Cys	Thr	Arg	Thr	Arg	His	Ser
		195					200					205			
Lys	Arg	Ser	Arg	Arg	Ser	Val	Ser	Val	Gln	Thr	His	Gly	Glu	Ser	Ser
		210				215						220			
Leu	Val	Asn	Lys	Lys	Glu	Ala	Trp	Leu	Asp	Ser	Thr	Lys	Ala	Thr	Arg
225					230				235						240
Tyr	Leu	Met	Lys	Thr	Glu	Asn	Trp	Ile	Ile	Arg	Asn	Pro	Gly	Tyr	Ala
				245				250						255	
Phe	Leu	Ala	Ala	Val	Leu	Gly	Trp	Met	Leu	Gly	Ser	Asn	Asn	Gly	Gln
			260					265					270		
Arg	Val	Val	Phe	Thr	Ile	Leu	Leu	Leu	Val	Ala	Pro	Ala	Tyr	Ser	
		275					280					285			

Phe	Asn	Cys	Leu	Gly	Met	Gly	Asn	Arg	Asp	Phe	Ile	Glu	Gly	Ala	Ser	
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Gly	Ala	Thr	Trp	Val	Asp	Leu	Val	Leu	Glu	Gly	Asp	Ser	Cys	Leu	Thr	
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Ile	Met	Ala	Asn	Asp	Lys	Pro	Thr	Leu	Asp	Val	Arg	Met	Ile	Asn	Ile	
				325					330					335		
Glu	Ala	Ser	Gln	Leu	Ala	Glu	Val	Arg	Ser	Tyr	Cys	Tyr	His	Ala	Ser	
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Val	Thr	Asp	Ile	Ser	Thr	Val	Ala	Arg	Cys	Pro	Thr	Thr	Gly	Glu	Ala	
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His	Asn	Glu	Lys	Arg	Ala	Asp	Ser	Ser	Tyr	Val	Cys	Lys	Gln	Gly	Phe	
370						375					380					
Thr	Asp	Arg	Gly	Trp	Gly	Asn	Gly	Cys	Gly	Phe	Phe	Gly	Lys	Gly	Ser	
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Ile	Asp	Thr	Cys	Ala	Lys	Phe	Ser	Cys	Thr	Ser	Lys	Ala	Ile	Gly	Arg	
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Thr	Ile	Gln	Pro	Glu	Asn	Ile	Lys	Tyr	Lys	Val	Gly	Ile	Phe	Val	His	
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Gly	Thr	Thr	Thr	Ser	Glu	Asn	His	Gly	Asn	Tyr	Ser	Ala	Gln	Val	Gly	
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Ala	Ser	Gln	Ala	Ala	Lys	Phe	Thr	Val	Thr	Pro	Asn	Ala	Pro	Ser	Val	
450						455					460					
Ala	Leu	Lys	Leu	Gly	Asp	Tyr	Gly	Glu	Val	Thr	Leu	Asp	Cys	Glu	Pro	
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Arg	Ser	Gly	Leu	Asn	Thr	Glu	Ala	Phe	Tyr	Val	Met	Thr	Val	Gly	Ser	
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Lys	Ser	Phe	Leu	Val	His	Arg	Glu	Trp	Phe	His	Asp	Leu	Ala	Leu	Pro	
			500					505					510			
Trp	Thr	Ser	Pro	Ser	Ser	Thr	Ala	Trp	Arg	Asn	Arg	Glu	Leu	Leu	Met	
		515					520					525				
Glu	Phe	Glu	Gly	Ala	His	Ala	Thr	Lys	Gln	Ser	Val	Val	Ala	Leu	Gly	
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Ser	Gln	Glu	Gly	Gly	Leu	His	His	Ala	Leu	Ala	Gly	Ala	Ile	Val	Val	
545					550					555					560	
Glu	Tyr	Ser	Ser	Ser	Val	Met	Leu	Thr	Ser	Gly	His	Leu	Lys	Cys	Arg	
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Leu	Lys	Met	Asp	Lys	Leu	Ala	Leu	Lys	Gly	Thr	Thr	Tyr	Gly	Met	Cys	
			580					585					590			
Thr	Glu	Lys	Phe	Ser	Phe	Ala	Lys	Asn	Pro	Val	Asp	Thr	Gly	His	Gly	
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Thr	Val	Val	Ile	Glu	Leu	Ser	Tyr	Ser	Gly	Ser	Asp	Gly	Pro	Cys	Lys	
		610				615					620					
Ile	Pro	Ile	Val	Ser	Val	Ala	Ser	Leu	Asn	Asp	Met	Thr	Pro	Val	Gly	
625					630					635					640	
Arg	Leu	Val	Thr	Val	Asn	Pro	Phe	Val	Ala	Thr	Ser	Ser	Ala	Asn	Ser	
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Lys	Val	Leu	Val	Glu	Met	Glu	Pro	Pro	Phe	Gly	Asp	Ser	Tyr	Ile	Val	
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Val	Gly	Arg	Gly	Asp	Lys	Gln	Ile	Asn	His	His	Trp	His	Lys	Ala	Gly	
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Ser	Thr	Leu	Gly	Lys	Ala	Phe	Ser	Thr	Thr	Leu	Lys	Gly	Ala	Gln	Arg	

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Leu Ala Ala Leu Gly Asp Thr Ala Trp Asp Phe Gly Ser Ile Gly Gly				
705		710		715
Val Phe Asn Ser Ile Gly Arg Ala Val His Gln Val Phe Gly Gly Ala				
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Phe Arg Thr Leu Phe Gly Gly Met Ser Trp Ile Thr Gln Gly Leu Met				
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Gly Ala Leu Leu Leu Trp Met Gly Val Asn Ala Arg Asp Arg Ser Ile				
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Ala Leu Ala Phe Leu Ala Thr Gly Gly Val Leu Val Phe Leu Ala Thr				
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Asn Val Gly Ala Asp Gln Gly Cys Ala Ile Asn Phe Gly Lys Arg Glu				
785		790		795
Leu Lys Cys Gly Asp Gly Ile Phe Ile Phe Arg Asp Ser Asp Asp Trp				
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Leu Asn Lys Tyr Ser Tyr Tyr Pro Glu Asp Pro Val Lys Leu Ala Ser				
		820		825
Ile Val Lys Ala Ser Phe Glu Glu Gly Lys Cys Gly Leu Asn Ser Val				
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Asp Ser Leu Glu His Glu Met Trp Arg Ser Arg Ala Asp Glu Ile Asn				
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Ala Ile Phe Glu Glu Asn Glu Val Asp Ile Ser Val Val Val Gln Asp				
865		870		875
Pro Lys Asn Val Tyr Gln Arg Gly Thr His Pro Phe Ser Arg Ile Arg				
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Asp Gly Leu Gln Tyr Gly Trp Lys Thr Trp Gly Lys Asn Leu Val Phe				
		900		905
Ser Pro Gly Arg Lys Asn Gly Ser Phe Ile Ile Asp Gly Lys Ser Arg				
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Lys Glu Cys Pro Phe Ser Asn Arg Val Trp Asn Ser Phe Gln Ile Glu				
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Glu Phe Gly Thr Gly Val Phe Thr Thr Arg Val Tyr Met Asp Ala Val				
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Phe Glu Tyr Thr Ile Asp Cys Asp Gly Ser Ile Leu Gly Ala Ala Val				
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Asn Gly Lys Lys Ser Ala His Gly Ser Pro Thr Phe Trp Met Gly Ser				
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His Glu Val Asn Gly Thr Trp Met Ile His Thr Leu Glu Ala Leu Asp				
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Tyr Lys Glu Cys Glu Trp Pro Leu Thr His Thr Ile Gly Thr Ser Val				
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Glu Glu Ser Glu Met Phe Met Pro Arg Ser Ile Gly Gly Pro Val Ser				
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Ser His Asn His Ile Pro Gly Tyr Lys Val Gln Thr Asn Gly Pro Trp				
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Met Gln Val Pro Leu Glu Val Lys Arg Glu Ala Cys Pro Gly Thr Ser				
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Val Ile Ile Asp Gly Asn Cys Asp Gly Arg Gly Lys Ser Thr Arg Ser				
		1075		1080
Thr Thr Asp Ser Gly Lys Val Ile Pro Glu Trp Cys Cys Arg Ser Cys				
		1095		1100
1090				

Thr Met Pro Pro Val Ser Phe His Gly Ser Asp Gly Cys Trp Tyr Pro																			
1105				1110				1115										1120	
Met Glu Ile Arg Pro Arg Lys Thr His Glu Ser His Leu Val Arg Ser																			
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Trp Val Thr Ala Gly Glu Ile His Ala Val Pro Phe Gly Leu Val Ser																			
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Met Met Ile Ala Met Glu Val Val Leu Arg Lys Arg Gln Gly Pro Lys																			
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Gln Met Leu Val Gly Gly Val Val Leu Leu Gly Ala Met Leu Val Gly																			
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Gln Val Thr Leu Leu Asp Leu Leu Lys Leu Thr Val Ala Val Gly Leu																			
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His Phe His Glu Met Asn Asn Gly Gly Asp Ala Met Tyr Met Ala Leu																			
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Ile Ala Ala Phe Ser Ile Arg Pro Gly Leu Leu Ile Gly Phe Gly Leu																			
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Arg Thr Leu Trp Ser Pro Arg Glu Arg Leu Val Leu Thr Leu Gly Ala																			
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Ala Met Val Glu Ile Ala Leu Gly Gly Val Met Gly Gly Leu Trp Lys																			
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Tyr Leu Asn Ala Val Ser Leu Cys Ile Leu Thr Ile Asn Ala Val Ala																			
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Ser Arg Lys Ala Ser Asn Thr Ile Leu Pro Leu Met Ala Leu Leu Thr																			
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Pro Val Thr Met Ala Glu Val Arg Leu Ala Ala Met Phe Phe Cys Ala																			
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Met Val Ile Ile Gly Val Leu His Gln Asn Phe Lys Asp Thr Ser Met																			
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Gln Lys Thr Ile Pro Leu Val Ala Leu Thr Leu Thr Ser Tyr Leu Gly																			
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Leu Thr Gln Pro Phe Leu Gly Leu Cys Ala Phe Leu Ala Thr Arg Ile																			
1345																		1350	
Phe Gly Arg Arg Ser Ile Pro Val Asn Glu Ala Leu Ala Ala Ala Gly																			
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Leu Val Gly Val Leu Ala Gly Leu Ala Phe Gln Glu Met Glu Asn Phe																			
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Leu Gly Pro Ile Ala Val Gly Gly Leu Leu Met Met Leu Val Ser Val																			
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Ala Gly Arg Val Asp Gly Leu Glu Leu Lys Lys Leu Gly Glu Val Ser																			
			1410															1415	
Trp Glu Glu Glu Ala Glu Ile Ser Gly Ser Ser Ala Arg Tyr Asp Val																			
1425																		1430	
Ala Leu Ser Glu Gln Gly Glu Phe Lys Leu Leu Ser Glu Glu Lys Val																			
			1445															1450	
Pro Trp Asp Gln Val Val Met Thr Ser Leu Ala Leu Val Gly Ala Ala																			
			1460															1465	
Leu His Pro Phe Ala Leu Leu Leu Val Leu Ala Gly Trp Leu Phe His																			
			1475															1480	
Val Arg Gly Ala Arg Arg Ser Gly Asp Val Leu Trp Asp Ile Pro Thr																			
			1490															1495	
Pro Lys Ile Ile Glu Glu Cys Glu His Leu Glu Asp Gly Ile Tyr Gly																			
																		1500	

1505		1510		1515		1520
Ile Phe Gln Ser Thr Phe Leu Gly Ala Ser Gln Arg Gly Val Gly Val						
	1525		1530		1535	
Ala Gln Gly Gly Val Phe His Thr Met Trp His Val Thr Arg Gly Ala						
	1540		1545		1550	
Phe Leu Val Arg Asn Gly Lys Lys Leu Ile Pro Ser Trp Ala Ser Val						
	1555		1560		1565	
Lys Glu Asp Leu Val Ala Tyr Gly Gly Ser Trp Lys Leu Glu Gly Arg						
	1570		1575		1580	
Trp Asp Gly Glu Glu Glu Val Gln Leu Ile Ala Ala Val Pro Gly Lys						
1585	1590		1595		1600	
Asn Val Val Asn Val Gln Thr Lys Pro Ser Leu Phe Lys Val Arg Asn						
	1605		1610		1615	
Gly Gly Glu Ile Gly Ala Val Ala Leu Asp Tyr Pro Ser Gly Thr Ser						
	1620		1625		1630	
Gly Ser Pro Ile Val Asn Arg Asn Gly Glu Val Ile Gly Leu Tyr Gly						
	1635		1640		1645	
Asn Gly Ile Leu Val Gly Asp Asn Ser Phe Val Ser Ala Ile Ser Gln						
	1650		1655		1660	
Thr Glu Val Lys Glu Glu Gly Lys Glu Glu Leu Gln Glu Ile Pro Thr						
1665	1670		1675		1680	
Met Leu Lys Lys Gly Met Thr Thr Val Leu Asp Phe His Pro Gly Ala						
	1685		1690		1695	
Gly Lys Thr Arg Arg Phe Leu Pro Gln Ile Leu Ala Glu Cys Ala Arg						
	1700		1705		1710	
Arg Arg Leu Arg Thr Leu Val Leu Ala Pro Thr Arg Val Val Leu Ser						
	1715		1720		1725	
Glu Met Lys Glu Ala Phe His Gly Leu Asp Val Lys Phe His Thr Gln						
	1730		1735		1740	
Ala Phe Ser Ala His Gly Ser Gly Arg Glu Val Ile Asp Ala Met Cys						
1745	1750		1755		1760	
His Ala Thr Leu Thr Tyr Arg Met Leu Glu Pro Thr Arg Val Val Asn						
	1765		1770		1775	
Trp Glu Val Ile Ile Met Asp Glu Ala His Phe Leu Asp Pro Ala Ser						
	1780		1785		1790	
Ile Ala Ala Arg Gly Trp Ala Ala His Arg Ala Arg Ala Asn Glu Ser						
	1795		1800		1805	
Ala Thr Ile Leu Met Thr Ala Thr Pro Pro Gly Thr Ser Asp Glu Phe						
	1810		1815		1820	
Pro His Ser Asn Gly Glu Ile Glu Asp Val Gln Thr Asp Ile Pro Ser						
1825	1830		1835		1840	
Glu Pro Trp Asn Thr Gly His Asp Trp Ile Leu Ala Asp Lys Arg Pro						
	1845		1850		1855	
Thr Ala Trp Phe Leu Pro Ser Ile Arg Ala Ala Asn Val Met Ala Ala						
	1860		1865		1870	
Ser Leu Arg Lys Ala Gly Lys Ser Val Val Val Leu Asn Arg Lys Thr						
	1875		1880		1885	
Phe Glu Arg Glu Tyr Pro Thr Ile Lys Gln Lys Lys Pro Asp Phe Ile						
	1890		1895		1900	
Leu Ala Thr Asp Ile Ala Glu Met Gly Ala Asn Leu Cys Val Glu Arg						
1905	1910		1915		1920	

Val Leu Asp Cys Arg Thr Ala Phe Lys Pro Val Leu Val Asp Glu Gly
1925 1930 1935
Arg Lys Val Ala Ile Lys Gly Pro Leu Arg Ile Ser Ala Ser Ser Ala
1940 1945 1950
Ala Gln Arg Arg Gly Arg Ile Gly Arg Asn Pro Asn Arg Asp Gly Asp
1955 1960 1965
Ser Tyr Tyr Tyr Ser Glu Pro Thr Ser Glu Asn Asn Ala His His Val
1970 1975 1980
Cys Trp Leu Glu Ala Ser Met Leu Leu Asp Asn Met Glu Val Arg Gly
1985 1990 1995 2000
Gly Met Val Ala Pro Leu Tyr Gly Val Glu Gly Thr Lys Thr Pro Val
2005 2010 2015
Ser Pro Gly Glu Met Arg Leu Arg Asp Asp Gln Arg Lys Val Phe Arg
2020 2025 2030
Glu Leu Val Arg Asn Cys Asp Leu Pro Val Trp Leu Ser Trp Gln Val
2035 2040 2045
Ala Lys Ala Gly Leu Lys Thr Asn Asp Arg Lys Trp Cys Phe Glu Gly
2050 2055 2060
Pro Glu Glu His Glu Ile Leu Asn Asp Ser Gly Glu Thr Val Lys Cys
2065 2070 2075 2080
Arg Ala Pro Gly Gly Ala Lys Lys Pro Leu Arg Pro Arg Trp Cys Asp
2085 2090 2095
Glu Arg Val Ser Ser Asp Gln Ser Ala Leu Ser Glu Phe Ile Lys Phe
2100 2105 2110
Ala Glu Gly Arg Arg Gly Ala Ala Glu Val Leu Val Val Leu Ser Glu
2115 2120 2125
Leu Pro Asp Phe Leu Ala Lys Lys Gly Gly Glu Ala Met Asp Thr Ile
2130 2135 2140
Ser Val Phe Leu His Ser Glu Glu Gly Ser Arg Ala Tyr Arg Asn Ala
2145 2150 2155 2160
Leu Ser Met Met Pro Glu Ala Met Thr Ile Val Met Leu Phe Ile Leu
2165 2170 2175
Ala Gly Leu Leu Thr Ser Gly Met Val Ile Phe Phe Met Ser Pro Lys
2180 2185 2190
Gly Ile Ser Arg Met Ser Met Ala Met Gly Thr Met Ala Gly Cys Gly
2195 2200 2205
Tyr Leu Met Phe Leu Gly Gly Val Lys Pro Thr His Ile Ser Tyr Val
2210 2215 2220
Met Leu Ile Phe Phe Val Leu Met Val Val Val Ile Pro Glu Pro Gly
2225 2230 2235 2240
Gln Gln Arg Ser Ile Gln Asp Asn Gln Val Ala Tyr Leu Ile Ile Gly
2245 2250 2255
Ile Leu Thr Leu Val Ser Ala Val Ala Ala Asn Glu Leu Gly Met Leu
2260 2265 2270
Glu Lys Thr Lys Glu Asp Leu Phe Gly Lys Lys Asn Leu Ile Pro Ser
2275 2280 2285
Ser Ala Ser Pro Trp Ser Trp Pro Asp Leu Asp Leu Lys Pro Gly Ala
2290 2295 2300
Ala Trp Thr Val Tyr Val Gly Ile Val Thr Met Leu Ser Pro Met Leu
2305 2310 2315 2320
His His Trp Ile Lys Val Glu Tyr Gly Asn Leu Ser Leu Ser Gly Ile

	2325		2330		2335
Ala Gln Ser	Ala Ser Val	Leu Ser Phe	Met Asp Lys	Gly Ile Pro	Phe
	2340		2345		2350
Met Lys Met	Asn Ile Ser	Val Ile Met	Leu Leu Val	Ser Gly Trp	Asn
	2355		2360		2365
Ser Ile Thr	Val Met Pro	Leu Leu Cys	Gly Ile Gly	Cys Ala Met	Leu
	2370		2375		2380
His Trp Ser	Leu Ile Leu	Pro Gly Ile	Lys Ala Gln	Gln Ser Lys	Leu
2385		2390		2395	2400
Ala Gln Arg	Arg Val Phe	His Gly Val	Ala Lys Asn	Pro Val Val	Asp
	2405		2410		2415
Gly Asn Pro	Thr Val Asp	Ile Glu Glu	Ala Pro Glu	Met Pro Ala	Leu
	2420		2425		2430
Tyr Glu Lys	Lys Leu Ala	Leu Tyr Leu	Leu Leu Ala	Leu Ser Leu	Ala
	2435		2440		2445
Ser Val Ala	Met Cys Arg	Thr Pro Phe	Ser Leu Ala	Glu Gly Ile	Val
	2450		2455		2460
Leu Ala Ser	Ala Ala Leu	Gly Pro Leu	Ile Glu Gly	Asn Thr Ser	Leu
2465		2470		2475	2480
Leu Trp Asn	Gly Pro Met	Ala Val Ser	Met Thr Gly	Val Met Arg	Gly
	2485		2490		2495
Asn His Tyr	Ala Phe Val	Gly Val Met	Tyr Asn Leu	Trp Lys Met	Lys
	2500		2505		2510
Thr Gly Arg	Gly Ser Ala	Asn Gly Lys	Thr Leu Gly	Glu Val Trp	
	2515		2520		2525
Lys Arg Glu	Leu Asn Leu	Leu Asp Lys	Arg Gln Phe	Glu Leu Tyr	Lys
	2530		2535		2540
Arg Thr Asp	Ile Val Glu	Val Asp Arg	Asp Thr Ala	Arg Arg His	Leu
2545		2550		2555	2560
Ala Glu Gly	Lys Val Asp	Thr Gly Val	Ala Val Ser	Arg Gly Thr	Ala
	2565		2570		2575
Lys Leu Arg	Trp Phe His	Glu Arg Gly	Tyr Val Lys	Leu Glu Gly	Arg
	2580		2585		2590
Val Ile Asp	Leu Gly Cys	Gly Arg Gly	Gly Trp Cys	Tyr Tyr Ala	Ala
	2595		2600		2605
Ala Gln Lys	Glu Val Ser	Gly Val Lys	Gly Phe Thr	Leu Gly Arg	Asp
	2610		2615		2620
Gly His Glu	Lys Pro Met	Asn Val Gln	Ser Leu Gly	Trp Asn Ile	Ile
2625		2630		2635	2640
Thr Phe Lys	Asp Lys Thr	Asp Ile His	Arg Leu Glu	Pro Val Lys	Cys
	2645		2650		2655
Asp Thr Leu	Leu Cys Asp	Ile Gly Glu	Ser Ser Ser	Ser Ser Val	Thr
	2660		2665		2670
Glu Gly Glu	Arg Thr Val	Arg Val Leu	Asp Thr Val	Glu Lys Trp	Leu
	2675		2680		2685
Ala Cys Gly	Val Asp Asn	Phe Cys Val	Lys Val Leu	Ala Pro Tyr	Met
	2690		2695		2700
Pro Asp Val	Leu Glu Lys	Leu Glu Leu	Leu Gln Arg	Arg Phe Gly	Gly
2705		2710		2715	2720
Thr Val Ile	Arg Asn Pro	Leu Ser Arg	Asn Ser Thr	His Glu Met	Tyr
	2725		2730		2735

Tyr Val Ser Gly Ala Arg Ser Asn Val Thr Phe Thr Val Asn Gln Thr	2740	2745	2750
Ser Arg Leu Leu Met Arg Arg Met Arg Arg Pro Thr Gly Lys Val Thr	2755	2760	2765
Leu Glu Ala Asp Val Ile Leu Pro Ile Gly Thr Arg Ser Val Glu Thr	2770	2775	2780
Asp Lys Gly Pro Leu Asp Lys Glu Ala Ile Glu Glu Arg Val Glu Arg	2785	2790	2795
Ile Lys Ser Glu Tyr Met Thr Ser Trp Phe Tyr Asp Asn Asp Asn Pro	2805	2810	2815
Tyr Arg Thr Trp His Tyr Cys Gly Ser Tyr Val Thr Lys Thr Ser Gly	2820	2825	2830
Ser Ala Ala Ser Met Val Asn Gly Val Ile Lys Ile Leu Thr Tyr Pro	2835	2840	2845
Trp Asp Arg Ile Glu Glu Val Thr Arg Met Ala Met Thr Asp Thr Thr	2850	2855	2860
Pro Phe Gly Gln Gln Arg Val Phe Lys Glu Lys Val Asp Thr Arg Ala	2865	2870	2875
Lys Asp Pro Pro Ala Gly Thr Arg Lys Ile Met Lys Val Val Asn Arg	2885	2890	2895
Trp Leu Phe Arg His Leu Ala Arg Glu Lys Asn Pro Arg Leu Cys Thr	2900	2905	2910
Lys Glu Glu Phe Ile Ala Lys Val Arg Ser His Ala Ala Ile Gly Ala	2915	2920	2925
Tyr Leu Glu Glu Gln Glu Gln Trp Lys Thr Ala Asn Glu Ala Val Gln	2930	2935	2940
Asp Pro Lys Phe Trp Glu Leu Val Asp Glu Glu Arg Lys Leu His Gln	2945	2950	2955
Gln Gly Arg Cys Arg Thr Cys Val Tyr Asn Met Met Gly Lys Arg Glu	2965	2970	2975
Lys Lys Leu Ser Glu Phe Gly Lys Ala Lys Gly Ser Arg Ala Ile Trp	2980	2985	2990
Tyr Met Trp Leu Gly Ala Arg Tyr Leu Glu Phe Glu Ala Leu Gly Phe	2995	3000	3005
Leu Asn Glu Asp His Trp Ala Ser Arg Glu Asn Ser Gly Gly Gly Val	3010	3015	3020
Glu Gly Ile Gly Leu Gln Tyr Leu Gly Tyr Val Ile Arg Asp Leu Ala	3025	3030	3035
Ala Met Asp Gly Gly Phe Tyr Ala Asp Asp Thr Ala Gly Trp Asp	3045	3050	3055
Thr Arg Ile Thr Glu Ala Asp Leu Asp Asp Glu Gln Glu Ile Leu Asn	3060	3065	3070
Tyr Met Ser Pro His His Lys Lys Leu Ala Gln Ala Val Met Glu Met	3075	3080	3085
Thr Tyr Lys Asn Lys Val Val Lys Val Leu Arg Pro Ala Pro Gly Gly	3090	3095	3100
Lys Ala Tyr Met Asp Val Ile Ser Arg Arg Asp Gln Arg Gly Ser Gly	3105	3110	3115
Gln Val Val Thr Tyr Ala Leu Asn Thr Ile Thr Asn Leu Lys Val Gln	3125	3130	3135
Leu Ile Arg Met Ala Glu Ala Glu Met Val Ile His His Gln His Val			

3140	3145	3150
Gln Asp Cys Asp Glu Ser Val Leu Thr Arg Leu Glu Ala Trp Leu Thr		
3155	3160	3165
Glu His Gly Cys Asp Arg Leu Lys Arg Met Ala Val Ser Gly Asp Asp		
3170	3175	3180
Cys Val Val Arg Pro Ile Asp Asp Arg Phe Gly Leu Ala Leu Ser His		
3185	3190	3195
Leu Asn Ala Met Ser Lys Val Arg Lys Asp Ile Ser Glu Trp Gln Pro		
3205	3210	3215
Ser Lys Gly Trp Asn Asp Trp Glu Asn Val Pro Phe Cys Ser His His		
3220	3225	3230
Phe His Glu Leu Gln Leu Lys Asp Gly Arg Arg Ile Val Val Pro Cys		
3235	3240	3245
Arg Glu Gln Asp Glu Leu Ile Gly Arg Gly Arg Val Ser Pro Gly Asn		
3250	3255	3260
Gly Trp Met Ile Lys Glu Thr Ala Cys Leu Ser Lys Ala Tyr Ala Asn		
3265	3270	3275
Met Trp Ser Leu Met Tyr Phe His Lys Arg Asp Met Arg Leu Leu Ser		
3285	3290	3295
Leu Ala Val Ser Ser Ala Val Pro Thr Ser Trp Val Pro Gln Gly Arg		
3300	3305	3310
Thr Thr Trp Ser Ile His Gly Lys Gly Glu Trp Met Thr Thr Glu Asp		
3315	3320	3325
Met Leu Glu Val Trp Asn Arg Val Trp Ile Thr Asn Asn Pro His Met		
3330	3335	3340
Gln Asp Lys Thr Met Val Lys Lys Trp Arg Asp Val Pro Tyr Leu Thr		
3345	3350	3355
Lys Arg Gln Asp Lys Leu Cys Gly Ser Leu Ile Gly Met Thr Asn Arg		
3365	3370	3375
Ala Thr Trp Ala Ser His Ile His Leu Val Ile His Arg Ile Arg Thr		
3380	3385	3390
Leu Ile Gly Gln Glu Lys Tyr Thr Asp Tyr Leu Thr Val Met Asp Arg		
3395	3400	3405
Tyr Ser Val Asp Ala Asp Leu Gln Leu Gly Glu Leu Ile		
3410	3415	3420

<210> 14

<211> 21

<212> DNA

<213> Artificial Sequence

<220>

<223> Derived from Yellow Fever virus and West Nile virus

<400> 14

cactgggaga gcttgaaggt c

21

<210> 15

<211> 25

<212> DNA
 <213> Artificial Sequence

 <220>
 <223> Derived from Yellow Fever virus and West Nile virus

 <400> 15
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 <210> 16
 <211> 21
 <212> DNA
 <213> Artificial Sequence

 <220>
 <223> Derived from Yellow Fever virus and Dengue-1 virus

 <400> 16
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 <210> 17
 <211> 26
 <212> DNA
 <213> Artificial Sequence

 <220>
 <223> Derived from Yellow Fever virus and Dengue-1 virus

 <400> 17
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 <210> 18
 <211> 21
 <212> DNA
 <213> Artificial Sequence

 <220>
 <223> Derived from Yellow Fever virus and Dengue-2 virus

 <400> 18
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 <210> 19
 <211> 26
 <212> DNA
 <213> Artificial Sequence

 <220>
 <223> Derived from Yellow Fever virus and Dengue-2 virus

<400> 19
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 <210> 20
 <211> 21
 <212> DNA
 <213> Artificial Sequence

 <220>
 <223> Derived from Yellow Fever virus and Dengue-3 virus

 <400> 20
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 <210> 21
 <211> 25
 <212> DNA
 <213> Artificial Sequence

 <220>
 <223> Derived from Yellow Fever virus and Dengue-3 virus

 <400> 21
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 <210> 22
 <211> 21
 <212> DNA
 <213> Artificial Sequence

 <220>
 <223> Derived from Yellow Fever virus and Dengue-4 virus

 <400> 22
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 <210> 23
 <211> 25
 <212> DNA
 <213> Artificial Sequence

 <220>
 <223> Derived from Yellow Fever virus and Dengue-4 virus

 <400> 23
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 <210> 24
 <211> 21
 <212> DNA
 <213> Artificial Sequence

<220>
 <223> Derived from Yellow Fever virus and St. Louis
 Encephalitis virus

<400> 24
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<210> 25
 <211> 25
 <212> DNA
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<220>
 <223> Derived from Yellow Fever virus and St. Louis
 Encephalitis virus

<400> 25
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<210> 26
 <211> 21
 <212> DNA
 <213> Artificial Sequence

<220>
 <223> Derived from Yellow Fever virus and Murray Valley
 Encephalitis virus

<400> 26
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<210> 27
 <211> 26
 <212> DNA
 <213> Artificial Sequence

<220>
 <223> Derived from Yellow Fever virus and Murray Valley
 Encephalitis virus

<400> 27
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<210> 28
 <211> 21
 <212> DNA
 <213> Artificial Sequence

<220>
 <223> Derived from Yellow Fever virus and Tick-Borne
 Encephalitis virus

<400> 28
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21

<210> 29
<211> 25
<212> DNA
<213> Artificial Sequence

<220>
<223> Derived from Yellow Fever virus and Tick-Borne
Encephalitis virus

<400> 29
actgggaacc tcacccgcgg tttaa

25

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